**Market Opportunities for Employment-Intensive Sustainable Energies: Elements for a Strategy to Promote Local Employment and Value through RE/EE**

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| **Part 1: Structure and Evolution of the Political and Institutional Framework** | |
| **Policy Goals and Targets** | **New National Energy Objectives until 2030**[[1]](#endnote-1)   |  |  | | --- | --- | | **Targets:** | **Sectors:** | | 1. **EE**: Reduce primary energy consumption by **25%** until 2030 (against a BAU scenario) 2. Share of **RE** sources in the electricity mix: **52%** by 2030 (additional **10 GW** between 2016 and 2030) | * **20%** inbuildings * **35%** intransport * **2.5%/yr** inindustry * **0.2/yr** in agriculture/fishery   + **4,500 MW** solar   + **4,300 MW** wind   + **1,300 MW** hydro |   **Moroccan Solar Plan (2009)**   * Installation of **2 GW** solar power by 2020 (CSP + PV)   Figure 1: Morocco’s Electrical Energy Mix 2013-2020. Source: RES4MED elaboration on ONEE data.   * 5 sites: Ouarzazate, Midelt, Tata, Boujdour and Laâyoune * Implementation by **MASEN**   **Moroccan Wind Energy Plan (2009)**   * Installation of **2 GW** wind power by 2020 * Annual production capacity of 6,600 GWh * Supervised by ONEE   **Rural Electrification Action Plan (2015-2017)**  (Current electrification rate: 99.13% of villages, October 2015)   * Electrification of 2,437 villages, i.e. 69,718 households (with access to grid) * Electrification of 3,900 schools, 170 clinics and 1,550 mosques   **National Industrial Strategy (2014-2020)**   * Increase industrial GDP to 23% of the overall GDP * Creation of 500,000 new jobs in the industry * Creation of “ecosystems” per zone with assessments of skill needs and corresponding trainings of technicians * PPP financing measures (e.g. Industrial Development Fund)   **National Employment Strategy (2015-2025)[[2]](#endnote-2)**   * Reduce unemployment rate from 9.6% in 2013 to 8.7% (2017) and 3.9 (2025)  |  |  | | --- | --- | | **Sector(s)** | **Target (in thousands) from 2013 to 2025** | | Primary sector: agriculture, forest, fishing, mining, energy, water | decrease jobs by only 129 (instead of 503) | | Secondary sector: manufacturing industry | increase jobs by 408 (instead of 92) | | Tertiary sector: services | increase jobs by 1,086 (instead of 960) | | Buildings and civil works | increase jobs by 203 (instead of 165) |  * Improve integration of women and training of young people in rural areas * Integrate skill needs identification mechanisms   **National Vocational Training Strategy (until 2021)**   * Increase employment integration rate of graduates to 75% (by improving training quality) * Mapping of professions and competencies * Enhance dual training system * Opening of vocational trainings to a broader group (young people <15, artists, farmers, fishermen, …) |
| **Legal-Regulatory Framework** | **RE Law 13-09 (2010)**   * right for a private operator to generate electricity from RE sources on behalf of an individual consumer or a group of consumers connected to the national **MV, HV or VHV grid** (decree for MV only approved in 2015) * ability to export electricity from renewable sources, by using the national grid or constructing a direct line to the interconnection   **EE Law 47-09 (2011)**   * Limits on energy consumption of equipment and devices, buildings & vehicles * EE incentives in road transport (purchase of new taxis) * Compulsory energy impact assessments for new big construction projects and mandatory energy audits for energy intensive industries * **Decree 2-13-874** of 2014 defines EE requirements for new buildings in the residential and tertiary sector (hotels, schools, hospitals and administrative buildings) according to 6 climatic zones. On its basis, the **Thermal Regulation for Moroccan Buildings (RTCM)** was elaborated and entered into force in December 2015.   **New Moroccan Public-Private Partnership (PPP) Law 86-12 (2014)**   * Published on 24 December 2014, **decree** for implementation under development * Prior **assessment** by public authority to determine whether concluding a PPP is more advantageous than any other form of contract (= public sector comparator approach) * 3 possible award procedures: call for **tenders**, **competitive dialogue** and **negotiated procedure** * **Domestic preference criterion**: portion subcontracted to domestic SMEs taken into account   **Public Tendering**   * **Decree 1-06-15** of 2006 obliges public institutions to employ competitive calls for tender in the award of projects * **Solar** tenders are launched by MASEN, **wind** tenders by ONEE   **Self-Generation Law 16-08 (2008)** allows major industrial facilities to self-generate their power up to 50 MW (the previous limit was 10 MW). An additional amendment for self-generation is planned (> 300 MW) but not yet approved. |
| **Support Programs and Financing Schemes** | **RE/EE Funds**   * **Energy Development Fund (EDF):** 1 billion USD (from Hassan II Fund, UAE, Saudi Arabia); 50% used for financing subsidies (e.g. measures in the framework of PNAP (National Program of Urgent Actions, 2009), 50% used as revolving fund (e.g. financing SIE-projects) * **Renewable Energy Fund (FER):** 2 billion MAD (from SIE); equity investments in new and established companies producing RE/EE-products; a special financing was focusing on wind projects   **Morocco Sustainable Energy Financing Facility (MorSEFF)**   * Credit line for sustainable energy projects in the private sector (80 million EUR) developed by EBRD, EIB, KfW & AFD, supported by a grant from the EU Commission * Loans and leasing (by local banks: BMCE and GBP), investment subsidies (10%) and technical support * Targeted at private Moroccan companies in the industry, tertiary, transport and agricultural sector   In Morocco, major financing for RE development still comes from the government and from international funds rather than from local private investors and banks.[[3]](#endnote-3)  To date, public tendering of large RE projects constitutes the main mechanism in place. There is no obligation for ONEE to conclude long-term power purchase agreements with private producers. Neither feed-in tariffs nor net-metering schemes are available up to now.  **Customs Duty and Tax Exemptions**  Large-scale RE projects over 200 million MAD can, in addition to customs duty exemptions, qualify for a value-added tax exemption on all imported equipment, materials, and tools.[[4]](#endnote-4) Moreover, there is VAT tax deduction for solar water heating appliances (14% instead of 20%).  **EnergiPro Program**   * launched in 2006 to promote **auto-production** of electricity from renewable sources * it is currently being carried out within the 2 GW **wind program** as a component realized by the private sector   **National Program for Solar Pumps (2013)** (still blocked and very unlikely to be unblocked!)   * Subsidies from the Energy Development Fund (Groupe Crédit Agricole) up to 50% of the installation costs (max. 75,000 MAD)   **Demonstration Program for EE in Buildings (2009)** – financed by the EU   * Development and first implementation of the EE Building Code (CEEB) * Development of norms and technical guides (on the ADEREE website) * 9 demonstration projects chosen by ADEREE and UNDP, financed by the EU, until now 6 realized |
| **Grid and Market Access (Internal and External)** | **Private Market Access**  **RE Law 13-09** liberalized the RE market:  Electricity can be produced, delivered to national customers and exported by any private producer as long as they utilize RE sources within a trilateral contract with ONEE.   * Facilitation of new entries * Support of independent power producers (IPP)   **Authorization of RE Projects**   * **≥ 2 MW:** authorization procedure with MEMEE * **20 kW – 2 MW (for thermal power ≥ 8 MW):** declaration to MEMEE * **≤ 20 kW (for thermal power < 8 MW):** no permits required   **Grid Access for RE Projects**  High and very high voltage grids: **RE Law 13-09:** Any public and private RE producer has the   * **Right to be connected** to the MV, HV and VHV national electricity grid; for MV under the regulation of law 48-15 / decree 2-15-772 with some specific rules, which will be implemented from 2017 on. The MV grid operators are obliged to define until end of 2016 a 10-year capacity plan for the integration of RE in their respective territory. A current cap of 20% exceeding production is allowed to be fed into the HV/VHV grid. * **Possibility to build a direct electric distribution line**, if the electricity produced is aimed to be exported and the operator has entered into a formal agreement with ONEE.   Low voltage grids (law 58-15):   * opening of the LV grid is currently under preparation and discussion   **Current Grid Situation**  According to SIE, there are issues with integrating RE into the Moroccan transmission grid system (difficulties of maintaining a stable network over short periods of low voltage).[[5]](#endnote-5)AFD is currently supporting the improvement of the transmission network. Moreover, this issue has been addressed by the Electricity Transmission Program financed by the World Bank and implemented by ONEE, including an investment in the Moroccan transmission and distribution network (loan amount 123 million USD) from 2008 to 2012.[[6]](#endnote-6)  Test to connect a 2 MW PV plant (by Jet Energy) in Kenitra to the MV grid: until now, the plant is not yet connected. |
| **Other Issues (e.g. Zoning and Land Allocation)** | **Identification of Development Zones**  In Morocco, **ADEREE** identified, evaluated and realized the cartography of RE resources as well as proposed priority development zones for RE projects with high production capacity. Those zone are defined in a decree and according to law 13-09, any project larger than 2 MW must be located in one of these zones (for wind projects decree 2-10-578).[[7]](#endnote-7)  **Land Allocation**  According to **law 13-09**, an **authorization** for the construction of solar and wind farms needs to be granted by **MEMEE** which allows development only in designated areas and allocates land to RE projects.  **MASEN** is the agency responsible for the realization of the big solar projects. This agency has been given far-reaching authority, including the authority to expropriate private land for the purpose of developing solar projects.[[8]](#endnote-8)  There are no restrictions for foreign investors except for the use of agricultural land, which is only possible to lease for 99 years. But the problem of land availability for bigger projects is evident given the traditions of land use by nomads and overcrossing modern cadaster issues. |
| **Verification and Evaluation Mechanisms** | **Wind Energy**  In order to **monitor** the meeting of performance indicators of the **Wind Energy Plan**, **ONEE** will develop a **baseline** scenario and include the progress made in its **regular reporting**.  **Performance indicators** relate to the share of RE from energy generation, access to energy, CO2 emissions reductions, energy security, progress achieved towards government energy and RE commitments, wind generation and hydro storage, and generation capacity installed.  The progress will be compared to projected results, international standards and the performance of similar plans, such as for instance the CTF (Clean Technology Fund) financed Wind Plan in Egypt.  **EE control mechanisms**  In order to control the compliance with thermal regulations, observatories have been installed in the industrial and buildings sector.  **ADEREE system for RE/EE indicators** |
| **Open Issues / Reforms** | * Opening of LV gridsand eligibility to sell exceeding electricity from RE to LV grids * Definition of specific support mechanisms for small-scale RE projects * Definition of rules and standards for EE in the industry and in existing buildings * Legal treatment of solar pumps in the agricultural sector * Decree for implementing PPA law |
| **Main Obstacles / Gaps** | * No adapted policy framework or support mechanisms for distributed generation / small projects neither for electricity nor for heat * Procedures for conclusion of a PPA too complicated, in-transparent/unclear and time-consuming (to be tackled in the implementation decree for the PPP law?) |

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| **Part 2: Structure and Evolution of the Energy System** | |
| **State & Key Properties of the Energy System** | **Generation**  The country produces marginal amounts of oil, natural gas and refined petroleum products, which are mainly consumed domestically, but fall well below the demand (import dependency: 95%). Over the past decade, Morocco has taken a series of bold steps to diversify its energy mix, particularly in the electricity sector. In order to reduce its dependence on foreign imports, Morocco plans to develop RE, mainly solar and wind. EE has been identified as another national priority.  **Transmission/Distribution**  ONEE is responsible for operating and expanding the Moroccan transmission grid as well as major parts of the distribution grid. Aside from a small isolated network in the extreme south of the country, the transmission grid covers the entire country and is interconnected with the European and Algerian power networks. Transmission lines to Algeria/Tunisia were constructed in the 1990s and 2000s and the Morocco-Spain network with two lines was built in 1997 and 2006.[[9]](#endnote-9) The latter will be reinforced with a third line, raising the gross exchange capacity to 2,100 MW (net capacity around 1350 MW).  Morocco is expanding its oil storage and distribution capabilities (in Tangier and Jorf Lasfar) to improve its security of supply. A portion of the Maghreb-Europe Pipeline (also known as the Pedro Duran Farell pipeline), which transports natural gas between Algeria and Spain, passes through Morocco. Instead of transit fees, Morocco receives natural gas (7% of the transported volume).[[10]](#endnote-10)  **Consumption**  Morocco is faced with a very strong growth of the domestic energy demand, having increased by 60% from 2002 to 2012, with demand rising in all sectors at a similar rate. The transport sector is the largest consumer of energy in Morocco, accounting for over a third of the total final consumption in 2013. The industrial and residential sectors follow suit; together they make up more than 40% of Morocco’s energy consumption (figure 3). Due to the key role of the transport sector, petroleum is still by far the most important source of energy (while its traditionally large role for power generation is decreasing). Coal is rapidly gaining in importance as a source of power and heat (as is natural gas). The heavily subsidized Butan is still a major source of heat in the residential sector, as is traditional biomass (the latter often not recorded for). For the time being, the roll-out of RE is mitigating this situation, but not reversing it.    Figure 3: Energy Consumption in Morocco in 2013, by fuel. Source: own illustration based on: <http://www.worldfuturecouncil.org/fileadmin/user_upload/PDF/Report_Morocco_A4_LoRes_EN.pdf>  Figure 2: Energy Consumption in Morocco in 2013, by sector. Source: own illustration based on: [www.iea.org/statistics/statisticssearch/report/?country=MOROCCO&product=Balances&year=2013](http://www.iea.org/statistics/statisticssearch/report/?country=MOROCCO&product=Balances&year=2013)  **Imports / Exports**  Total primary energy supply (TPES) in Morocco reached 18.8 Mtoe in 2012 (**+58.2%** since 2002). The country is heavily dependent on external energy supply sources, **importing up to 95%** of its needs.   * **Coal, crude oil and oil products** are imported from various world markets. * **Natural gas** imports come from Algeria (as transit fee and for the 450 MW IGCC Power plant at Ain Beni Mathar), Butan and Propan are imported as pressured gas.   Figure 4: Energy Imports and Exports in Morocco in 2013, by fuel. Source: own illustration based on: [www.iea.org/statistics/statisticssearch/report/?country=MOROCCO&product=Balances&year=2013](http://www.iea.org/statistics/statisticssearch/report/?country=MOROCCO&product=Balances&year=2013)   * **Electricity** imports come from Spain (connected synchronously by a 400 kV interconnection with a net 1.4 GW capacity). |
| **State & Key Properties of Renewable Energies** | The **solar and wind energy potentials** in Morocco are very high: The average solar irradiation level is around **6.3 kWh/m²/day** andwinds can reach an average speed of up to **11 m/s** on Morocco’s 3,500 km coastline, which is among the highest in the world.  **Solar Irradiation Map (MASEN) and Solar & Wind Atlas (ADEREE)**  The Solar Irradiation Map was developed by DLR and Paris MinTech, mapping the maximal direct normal irradiation (DNI) for the CSP-plants of MASEN (not published).  The Solar and Wind Atlas is a tool on the website of ADEREE (developed by NOVELTIS, France) with information about the average annual DNI and GHI (global horizontal irradiation) and average wind speed on the territory of Morocco. More detailed data are available at ADEREE against payment.    Figure 5: RE atlases for Morocco – form left to right: solar DNI, solar GHI, wind speed at 30 meters, wind speed at 100 meters. Sources: <http://www.aderee.ma/images/Text_Pic/Others/Cartes_Solaires.pdf> and <http://www.aderee.ma/images/Text_Pic/Others/Cartes_Eoliennes.pdf>  **Use of Renewable Energies**  For the time being, RE are almost exclusively used for power generation - their role as a source of heat and mobility is still negligible. With regard to installed RE capacities in the power sector, hydro is still the no. 1 source, but highly depending on yearly variations of rainfalls (🡪 increasing capacity in pumped hydro). Wind and solar are, however, catching up fast. Currently, about 730 MW of wind and 200 MW of solar are under operation, and the pipeline of projects is growing quickly.  **Solar Power**   * **PV & CSP:** Moroccan Solar Energy Program “**NOOR**” (by MASEN, ONEE)[[11]](#endnote-11)  |  |  |  | | --- | --- | --- | | **In operation** | **Under Development** | **Planned until 2020** | | NOOR I Ouarzazate (**160 MW CSP**)  since February 2016 | NOOR II - IV Ouarzazate (**350 MW CSP + 70 MW PV**) | NOOR Laâyoune & Boujdour (**100 MW PV**)  NOOR Tafilalt and Atlas (**400 MW PV**)  NOOR Midelt (**300 MW CSP + 300 MW PV**)  NOOR Tata (**300 MW CSP + 300 MW PV**)  Solar plants in economic zones (**150 MW PV**) |   In January 2016, MASEN launched a tender for the first phase (400 MW) of the PV/CSP power plant in Midelt.   * **PV**   + **ONEE** is implementing a **400 MW** program of medium-sized **PV** power plants (each 20-30 MW) as end-of-the-line projects to stabilize the transmission grid.   + A small number of **PV rooftop installations** already exists (e.g. Casablanca airport, 3 buildings of MEMEE, ADEREE, universities and Technopark in Casablanca)   + Rural electrification program PERG started in 1996 to deploy **solar home systems** in the most isolated areas where grid extension was more difficult to achieve (around 100 000 systems).   + **Solar Water Pumps** (drinking water and irrigation): According to ADEREE, over 4,000 solar pumps have been in use since the end of 2014. Despite of the ongoing blockage of the state-funded roll-out program for solar water pumps (which targets the installation of 5,000 pumps/year with a total capacity of 15 MW) farmers are increasingly installing them on their own account (often without authorization, which is jeopardizing groundwater supplies in arid regions)**.** * **CSP**   + A hybrid natural gas plant associated with 20 MW of CSP is in operation in Ain Beni Mathar. On February 4, 2016, the NOOR I CSP plant near Ouarzazate with an electricity production of 160 MW was inaugurated. It is one of the largest plants of its kind worldwide.   + Morocco is currently the most important and fastest growing CSP market in the MENA region. * **SWH**   + Government targets for SWH market development: 1.7 million m2 (2020) and 3 million m2 (2030)   + UN-funded initiative **PROMASOL** (2002-2008): from 50,000 m2 to 240,000 m2   + By 2014, 530,093 m2 SWH were installed in total, and 84,000 m2 during 2014 alone.   + National program **SHEMSI** (2012-2020) - not yet operational: Funding, Labeling/Certification, Communication and Training, aiming at the installation of another 1.35 million of m² of solar water heaters until 2020.   **Wind Power**  Morocco has currently an installed wind power capacity of 737 MW. Three large wind parks are operated by ONEE, another four by private companies (under law 13-09). **The Integrated Wind Energy Project** aims to increase this capacity to over **2 GW** (2020), with capacity additions mainly foreseen for the Atlas regions and southern regions of Morocco.   |  |  |  | | --- | --- | --- | | **In Operation  (737 MW)** | **Under Construction**  **(470 MW)** | **Planned until 2020  (850 MW)** | | Tarfaya (300 MW)  Dhar Saadane-Tanger (140 MW)  Akhfenir-Tantan (100 MW)  Foum El Oued-Laâyoune (50 MW)  Amogdoul-Tanger (65 MW)  Haouma-Tanger (50 MW)  Tetouan (32 MW) | Taza (150 MW)  Akhfenir-Tantan (100MW)  Jbel Khalladi-Tanger (120MW) | Tanger II (100 MW)  Boujdour (100 MW)  Midelt (150 MW)  Jbel Lahdid-Essaouira (200 MW)  Tiskrad-Laâyoune (300 MW) |   In 2015, ONEE launched a public tender (which also contained specific provisions for local content) to realize the planned 850 MW wind parks until 2020. Among the 5 shortlisted consortia, the consortium made up of Morocco’s Nareva Holding, Italy's Enel Green Power (EGP) and Germany's Siemens submitted the lowest bid (around 0,3 Dh/kWh) and was chosen in December to develop the 5 wind projects on a BOO basis through a PPP.  **Biomass**  In Morocco biomass is mostly used in the traditional form of wood or charcoal for heating and cooking purposes in households, and in hammams and bakeries. According to ADEREE, until 2012, more than 7 MW of biogas were already installed through the treatment of waste water as well as agricultural and solid waste (in landfills). ADEREE has developed an action plan to identify and map the potential of biomass energy.[[12]](#endnote-12) The first results of the study conducted in the Souss-Massa-Draa region show that the global potential of the region (including the Essaouira province) is estimated at 2,794,758 MWh/yr, which corresponds to 190,563 toe/yr.[[13]](#endnote-13) A national program for the energetic use of biomass is in the planning phase and there are plans for an installed capacity of 400 MW by 2030.[[14]](#endnote-14) With the aim to develop a biomass strategy, the Moroccan government has launched a tender recently.  **Hydro Power**  In 2014, 1,360 GWh were produced in 26 hydro power stations operated by ONEE. In addition, hydro power comes partly from a 464 MW pumped storage power plant near Beni Mellal / Afourer. For the purpose of installing micro hydro power stations in Oued Oum Er Rbia, ADEREE has identified 200 potential sites in the mountainous regions. The amendment of the law 13-09 has raised the threshold for private sector investors in hydropower up to 30 MW. |
| **State & Key Properties of Energy Efficiency** | EE is a major priority of the Moroccan energy strategy, which targets 25-30% savings until 2030 compared to a BAU scenario through improvements in energy efficiency. NEEAPs have been implemented in all key sectors including transportation, industry, buildings and agriculture. According to the government, almost half of the savings (48%) could come from industry, nearly a fourth (24%) from transport and 19% from buildings.  **EE in buildings**  In 2008, the “INARA” program was launched by ONEE to replace 15 million incandescent light bulbs with CFLs, mainly in households and some administrative facilities. There is a new distribution program of 9 million efficient lamps, financed by KfW. With 5 million efficient lamps installed, savings of 182 MW could be reached. Moreover, the program “Energy Efficiency in Mosques” was initiated by the Ministry of Endowments and Islamic Affairs (MHAI), MEMEE and ADEREE, aiming at an energy upgrade of 15,000 mosques (pilot phase 2015-2017: 100 mosques). A GIZ program accompanies the program adding a focus on job creation.  **EE in the industry**  Targeting one of the important energy consuming sectors in Morocco, ADEREE developed a program in partnership with MEMEE called PEEI to implement EE measures in the industry. 58 energy audits (financed by EIB & AfDB) were conducted so far, identifying an energy saving potential of more than 15%. The measures to be taken include the institutional and regulatory upgrading (support for ESCOs, standards for energy management), financial support (for energy audits and EE investments), capacity building (specialized trainings, accreditation) as well as communication and awareness raising.[[15]](#endnote-15)  **EE in transport**  The transport sector is the most energy-intensive sector in Morocco. The national EE strategy envisages an information obligation about the energy consumption for vehicle fleets with more than 20 vehicles in 2015 and 10 vehicles in 2020; a 10% increase of the axle weight; programs for transportation of passengers; rearrangements of transport routes and R&D programs for alternative fuel.[[16]](#endnote-16)  **EE through introducing summer time (GMT+1)**  In order to save energy through an extra hour of sunlight, summer time (GMT+1) was introduced in 2008 and officially adopted in 2013. In 2014, power savings thereby reached 92 MW. |
| **Price Setting & Price Reforms** | **Subsidy Removal**  As a result of escalating expenses for the national budget, and in order to save ONEE from bankruptcy, the Moroccan government adopted an ambitious program of subsidy removal for (most) energy products in 2013 and 2014.   |  |  | | --- | --- | | **Subsidy on** | **Status** | | Gasoline & fuel oil | eliminated in 2013/14 | | Diesel fuel | reduced significantly in 2013/14, eliminated in 2015 | | Fuel used for electricity generation | eliminated in 2014 | | Bottled gas (butane) | still very high (customers pay only 1/3) |   **Electricity Pricing**  In 2014, electricity tariffs underwent an upward revision. However, end consumer prices still remain below the actual generation costs.   * **Household rates** are incremental, based on monthly consumption. For customers whose consumption exceeds 150 kWh/month, the highest price range reached in a given month is applied to the entire monthly electricity consumption. This new calculation method was introduced in August 2014.[[17]](#endnote-17)  |  |  | | --- | --- | | **Consumption (kWh/month)** | **MAD/kWh** | | 0 – 100 | 0.9010 | | 101 – 150 | 1.0370 | | 151 – 200 | 1.0370 | | 201 – 300 | 1.1282 | | 301 – 500 | 1.3351 | | > 500 | 1.5420 |   ONEE also offers pricing based on a **prepaid meter** exclusively available to **rural populations** with rates between MAD 1.07/kWh and MAD 1.391/kWh.   * **Medium and high-voltage rates** are generally lower than residential rates and are split into three categories: **off-peak, regular** and **peak hours** (including a **super-peak rate**). The rates are below the real average costs of production and transmission, which amounts to a hidden subsidy to final consumers estimated at around 0.30 MAD/kWh.[[18]](#endnote-18) But also these tariffs have been raised (and will be raised) in several steps until 2017 to tackle the deficit of ONEE (contract program between the State and ONEE 2014). |
| **Market Opening / Unbundling** | DiagramWith the exception of RE produced under the framework of law 13-09, **ONEE** acts as the **single buyer** in the sector and owns the complete transmission network and much of the distribution network (58%), which was opened to the private sector in 1995. ONEE can give concessions to private operators with purchase guarantees. Morocco’s power distribution subsector includes **7 local municipal utilities**, also known as “régies” as well as **3 private distribution utilities**, also known as “gestionnaires délégués”.[[19]](#endnote-19) These distribution companies are mostly distributing water and electricity and are also responsible for the waste water system. They have no right to produce electricity (except for their own internal needs) and are obliged to buy all their electricity from ONEE at a price of around 0,68 Dh/kWh. The tariff structure as well as the prices are fixed by an interministerial commission.  Figure 6: Energy Market overview. Source: <http://www.nortonrosefulbright.com/knowledge/publications/66419/renewable-energy-in-morocco>  In 2009, Morocco adopted a new national regulatory framework for the electricity sector, which provides for a **free market** for the exchange of electricity from renewable sources among producers and customers connected to the Moroccan HV and VHV electricity grid.  Draft Law 48-15, adopted in September 2015, aims at establishing a **new independent electricity regulatory institution** called **ANRE** (Autorité Nationale de Régulation de l’Électricité), which will help to clarify roles and responsibilities of all actors involved in the RE production, electricity transmission and distribution, and the management of the MV electrical system.[[20]](#endnote-20) |
| **Main Institutional Actors in Energy-Related Fields** | 1. **Ministries and other institutions**  |  |  | | --- | --- | | **Ministry of Energy, Mines, Water and Environment (MEMEE)**   * Primary responsibility for regulation of energy sector & implementation of suitable policies | * Direction de l'Electricité * Direction des ER et de l’EE |   **ADEREE (Agency for the Development of RE & EE)**   * Transformation of the Center for the Development of RE (CDER) into ADEREE under **Law 16-09** * Coordination & supervision of **RE/EE programs and projects** in line with the national and sectorial plans (with a focus on **decentralized** installations)   **ONEE (National Office for Electricity and Water)**   * Public utility in charge of **production** (50%), **transport** (100%, single TSO) and **distribution** (55% - except for the large cities) of electricity * Respond to electrical energy needs, manage & develop the **grid**, ensure extension of rural electrification * In charge of both thermal and renewables other than CSP solar projects. (A new arrangement between the actors for RE-project development is announced by the MEMEE and will be set up mid-2016.)   **MASEN (Moroccan Agency for Solar Energy)**   * Creation under **Law 87-09** and owned in equal parts by the government, ONEE, SIE & the Hassan II Fund * Responsible for implementation of the **Solar Plan** and for promotion of solar resources in all other aspects * **Centralized** production of 2 GW solar power until 2020   **SIE (Energy Investment Company)**   * Created by **Law 40-08**, state-owned & focused on financing national RE and EE projects * **State financing** through direct equity investment + **co-investment through financial partner** in project company  1. **Regulator**   New independent electricity regulatory institution called ANRE (Autorité Nationale de Régulation de l’Électricité) to be established.   1. **Electric Utilities in Morocco**  |  |  |  |  | | --- | --- | --- | --- | | * Main Producers | | | | | **Public Producers** | | **Private Producers** | | | ONEE, MASEN | | Jorf Lasfar Electricity Company (JLEC), Théolia, NAREVA, Lafarge, OCP | | | * Transmission System Operator | | | | | ONEE | | | | | * Main Distributors | | | | | **Direct Supplier** | **Delegated Distribution Companies** | | **Public Municipal Distribution Companies** | | ONEE | Lydec (Casablanca), Redal (Rabat), Amendis (Tanger / Tetouan) | | RADEEMA (Marrakech), REDEEF (Fès), RADEEO (Oujda), RADEES (Safi), RAK (Kenitra), RADEEL (Larache), RADEEC (Settat) |     Figure 7: Electricity supply in Morocco, 2012. Source: based on ONEE and World Bank:  <http://www.iai.it/sites/default/files/iaiwp1505.pdf> |
| **Open Issues / Reforms** | * Opening of the LV grid for private producers * Subsidy reductions for bottled gas (butane) * Government policy on solar water pumps * Establishment of a new independent electricity regulatory institution (ANRE) |
| **Main Obstacles / Gaps** | * Almost exclusive focus on large-scale power plants * Lack of grid access and financing mechanisms for small installations * Market distorting effects of high butane subsidies * No clear policy framework for EE in the industry and transport * Lack of qualified local suppliers of many RE/EE components and services |
| **Part 3: Structure and Evolution of Local Benefit Sharing** | |
| **Observable / Forecasted Value Creation** | **Economic Value Creation:**   * **Local share** in RE value creation so far low (mostly limited to infrastructure / construction works and technologically unsophisticated inputs / components: the next phase of the solar and wind plan is committed to change this; the 160MW CSP plant (NOOR I) awarded to ACWA Power, for instance, already includes a 42% local content portion (1,000 local workers during construction and 70 local workers during operation); the latest 850 MW wind tender includes the setting up of local manufacturing capacities (towers, blades) by Siemens * **Macroeconomic Stability:** estimated annual cost savings of 1,251 billion USD by replacing fossil fuel imports with locally produced wind energy by 2020 (within the Wind Energy Plan)[[21]](#endnote-21)   **Social Value Creation:**   * **Access to electricity:** for example through rural electrification through wind energy and small PV systems * **Energy security:** increasing the share of domestically produced RE reduces import dependency * **Innovation driver / Technology transfer:** Moroccan private sector to acquire RE specific technology and process knowhow – setup of several technological clusters, e.g. “Cluster Solaire” managed by MASEN.   **Environmental Impacts:**   * **The solar plan projects** are estimated to save 1 million toe/year and avoid 3.7 million tCO2/year.[[22]](#endnote-22) * **The wind energy plan** aims to save 1.5 million toe/year and avoid 5.6 million tCO2/year.[[23]](#endnote-23) * **The program of SWH market development** is estimated to save 102.6 ktoe/year in 2020 and 181 ktoe/year in 2030 and to avoid 682 ktCO2/year in 2020 and 1,024 ktCO2/year in 2030[[24]](#endnote-24) |
| **Observable / Forecasted Job Creation** | Figure 8: Forecasted RE/EE Job Creation (direct and indirect) in Morocco until 2020. Hypothesis for wind: 2GW installed & strong industrial integration scenario, for solar: 4GW & 50% CSP / 50% PV, for hydro: 6.6MW, for EE: BAU scenario. Source: MEMEE (2011) : Etude pour la Spécification des Besoins en Compétences dans le Secteur des Energies Renouvelables.  **Wind**  Job potential in the wind energy sector is especially in the **manufacturing of towers and blades** as well as in **civil works and ancillary services**. Blades are currently manufactured by international players, but in the manufacturing of towers, several Moroccan companies have already experience.[[25]](#endnote-25) The Wind Plan is expected to create a significant amount of green jobs: About **700 direct permanent jobs** in the **maintenance** of the wind farms, as well as over **direct 4,200 one-year jobs in construction** are being expected. Local manufacturing of the equipment is estimated to create additional jobs. In accordance with international research, about 4-5 permanent jobs can be created per MW.[[26]](#endnote-26)  **PV**  The highest job creation potential in the PV sector is in **installation** and **maintenance**, in addition to the production of **steel/aluminum structures** as well as of **electrical components**. Concerning the steel industry, there is still little experience in solar, but with equipment investment and technology transfer there is a real potential of manufacturing steel structures locally. The same accounts for the cable industry, which is very experienced in the automotive and aircraft industry by now but has to adapt its production in order to be able to provide PV specific components. 3 (poly-) crystalline silicone PV module assembly lines are already installed for small scale production of PV panels (PV Industry: 5 MWp, Droben: approx. 500 kWp, CleanTech: approx. 2 MWp). As the international market is very competitive, high investments need to be made in order to augment the capacity and achieve economies of scale. But first success stories are reported: exports of some MWp to Mauretania and Mali.  **CSP**  Concerning CSP, the situation is similar as for PV concerning the potential job creation areas. An additional advantage is that there is already experience from the prior CSP project in Ain Beni Mathar and the currently realized NOOR I project and thus skills in producing some components (steel torques), assembling of mirrors, piping, **grid connection** as well as in **operation** and **maintenance** of a CSP plant are already available.  **SWH**  It is estimated by MEMEE that through the program of SWH market development 920 permanent jobs will be created by 2020 and 1,600 by 2030.[[27]](#endnote-27) According to a Plan Bleu Study, 11,000 jobs can be created by 2030, 5,500 in manufacturing and 5,500 in installation and maintenance (estimates are based on the Tunisian PROSOL program), although reaching these figures would require a significant upward revision of the official targets (as a well as a considerable acceleration of the sluggish deployment rate).[[28]](#endnote-28)  **EE in the Building Sector**  According to the same Plan Bleu study, the potential job creation in the construction sector by 2030 is estimated at an accumulated 251,250 jobs, which accounts for approx. 10% of the population employed in the building sector in 2030.   |  |  | | --- | --- | | **EE measure** | **Job Creation by 2030** | | New Buildings | 150,000 – 200,000 | | Thermal Renovation | 55,000 – 80,000 | | Energy Efficient Lamps | 730 – 1,000 | | SWH | 11,000 | | **Total** | **216,730 – 292,000** |   A study of the Moroccan Energy Ministry[[29]](#endnote-29), conducted in 2011, identified a potential creation of **27,906 man years** from 2011 – 2020 in the residential, tertiary and administrative sector through an energy demand management action plan under a BAU scenario, of which **18,466 in Morocco**:   |  |  | | --- | --- | | **Immediate direct jobs (installation and manufacturing of equipment)** | **“Diffuse” direct jobs (O&M, organization, supervision and follow-up )** | | 14,505 in EE equipment (50% Moroccan) | 1,646 in engineering offices | | 8,567 in RE (75% Moroccan) | 2,037 in O&M and management | |  | 809 in organization, training & follow-up | |  | 195 in promotion | |  | 56 in financing tools | | **23,162** | **4,744** |   **EE in the industry**  The same study also analyzed the job creation in the industrial sector (through reductions of thermal and electric consumption). Between 2011 and 2020 and estimated **23,203** **man years** would be created through the energy demand management action plan under a BAU scenario, of which **15,092 in Morocco**:   |  |  | | --- | --- | | **Immediate direct jobs (installation and manufacturing of equipment)** | **“Diffuse” direct jobs (O&M, organization, supervision and follow-up )** | | 11,928 in EE equipment (50% Moroccan) | 1,344 in engineering offices | | 7,401 in RE (75% Moroccan) | 1,665 in O&M and management | |  | 661 in organization, training & follow-up | |  | 159 in promotion | |  | 45 in financing tools | | **19,329** | **3,874** | |
| **Existing Training & Research Capacities** | **Initial (Vocational) Training**  The curriculum for vocational training in Morocco consists of the following levels based on the French system:   * Professional Aptitude Certificate CAP (“Certificat d’Aptitude Professionnelle”) * Vocational Training Certificate BTP (“Brevet de Technicien Professionnel”) * Vocational Training Certificate BTS (“Brevet de Technicien Supérieur”)   In addition to that, there are 2 training systems (formations qualifiantes) in Morocco that can be accessed without a high school diploma (baccalauréat):   * Specialized workers (for six months, after primary education) * Qualified workers (for 1 year, after 9 years of school = Diplôme National de Brevet, DNB)   To achieve an approved technician title within the vocational education system, a high school diploma after 12 years of school is required (formation professionnelle initiale bac+2). This title allows students to enter into potentially better-paid jobs that may not necessarily require really technical work. However, in many cases those jobs are not available leaving many graduates unemployed.  By contrast, companies often express their **need for skilled workers** who have left school after primary education or after 10 years and who are more oriented towards practical work. These skills can, for instance, be acquired through a qualifying training (taking usually six months to one year), which do not require a baccalauréat. The **qualifying education** system, however, is not regulated in Morocco and diploma are not officially recognized. As the Moroccan society attaches high value to state-approved diploma, those apprentices are thus likely to have difficulties finding a job. In addition, they are usually trained in under-equipped workshops, so that they might not acquire the qualified and diversified skills that employers ask for. Vocational training therefore needs to become more realistic and application-oriented, which requires a much stronger involvement of the private sector in the development and implementation of training programs and exams.  The OFPPT, the Moroccan Vocational Training and Labor Promotion Office, runs 329 training centers in Morocco which have also started to introduce aspects of RE/EE in regular courses. However, especially practical training is not the main focus, also due to a lack of equipment, and an alternation of theoretical learning and company in-house training courses is usually not foreseen. Graduates of OFPPT courses may therefore not always have acquired the practical skills required by the companies. Another issue is the insufficient financing, training of the trainers and equipment at OFPPT training centers.  There are more than 12 public universities and several technical schools, professional institutes and private higher education establishments offering specialized programs dedicated to RE/EE. The following degrees can be obtained:   * **University Diploma in Technology** (Diplôme Universitaire de Technologie, DUT) * **Professional Bachelor’s Degree** (Licence Professionnelle, LP) * **Bachelor’s Degree in Science and Technology** (Licence en Sciences et Techniques, LST) * **Research Master Degree** (Master Recherche, MR) * **Specialized Master Degree** (Master Spécialisé, MS) * **Engineer Degree** (Diplôme d’Ingénieur d’Etat, DI)   **Further Vocational Training**  There are currently **14 training providers in the field of further vocational RE/EE-related training in Morocco**, of which the first 6 have answered to a GIZ questionnaire (the following information is based on their answers):   1. Agence Nationale pour le Développement des ER et EE (ADEREE) 2. Office National de l'Electricité et de l'Eau Potable (ONEE) 3. Instituts de Formation aux Métiers des ER et de l'EE (IFMEREE) 4. Société Marocaine d’Audit Efficacité Energétique (SMAEE) 5. TUV Certification Maroc 6. Bureau Veritas Morocco 7. Office de la Formation Professionnelle et de la Promotion du Travail (OFPPT) 8. Moroccan Agency for Solar Energy (MASEN) 9. Renewable Energy University Network (REUNET) 10. Institut de Formation aux Métiers de l'Eau, de l'Energie et de l'Environnement (IFORM3E) 11. AFNOR Maroc 12. Institut Supérieur des Hautes Etudes en Développement Durable (ISHEDD) 13. Cluster Solaire 14. Cluster EMC   Annually, some **35 courses** are offered by the six institutions for some **400 participants**, focusing mainly on EE (in construction), but further RE trainings are planned to be offered in the future. Most of the trainings are targeted at **professional beginners** or **advanced professionals** (engineers, technicians, project managers etc.). 4 of the 6 institutions already provide **train-the-trainer courses of their own**. Most of the trainers have received their certificates at engineering schools and several have been trained by **RENAC as in the case of ONEE and IFMEREE**.  In order to identify training needs and to keep training curricula up-to-date, all of the training providers that participated so far in the survey are in **regular contact with the industry** (or work in the respective fields themselves).  Comparing public and private training providers, it can be noticed that **private institutions** have a strong focus on **EE** and energy audits, i.e. they are rather specialized in a single field, whereas trainings dealing with **RE** are more likely to be found in **public institutions** which offer a broader set of trainings.  The **Department of Vocational Training** (DFP) in the Ministry of National Education and Vocational Training (MEFP) approved the training programs of the new IFMEREE in Oujda, which has so far the only **state-approved training program** in RE/EE besides the trainings offered by **OFPPT**, which works rather independently from the DFP and validates its programs itself (no exact information on RE/EE trainings of OFPPT is available at the moment). In the end, the graduates of both, IFMEREE and OFPPT, receive state-approved diploma. |
| **Anticipated Training & Research Needs** | **More certified trainings**  So far, officially recognized further vocational trainings in RE/EE do not exist, except for the IFMEREE training modules and possibly some OFPPT specialized technician trainings. In order to improve the training quality in RE/EE in Morocco, the development of further certified training programs is necessary.  Companies often express their **need for skilled workers** oriented towards practical work. However, professional education is not very positively perceived by society and the large majority of training providers are not officially recognized. An approval of diploma for qualifying trainings by official bodies would offer a great potential to satisfy the need for skilled workers on the one hand and to improve the job perspectives of the graduates on the other hand. |
| **Further Innovation Related Institutions** | * **IRESEN (Institute for Research into Solar and Renewable Energies)** launches calls for proposals for RE-technology research projects in cooperation with universities, research centers and various industry stakeholders * **REUNET (Renewable Energy University Network)** was founded in 2013 as a joint initiative of Moroccan academics, researchers, scientists and engineers and aims to promote the use of RE in Morocco through training, research and innovation in Moroccan universities. * **National Center for Scientific and Technical Research (CNRST)** Under the umbrella of the Ministry of Higher Education and Research, the CNRST is the executive body for the Moroccan research programs. * **Casablanca Technopark** (an incubator for start-ups, originally in the ITC sector, today also in RE/EE) * **Rabat Technopolis** (a technology “zone” with innovative companies and the International University of Rabat UIR) * **Several newly founded RE/EE clusters (Cluster Solaire, Cluster EMC…)** |
| **PSD / HCD Support Mechanisms** | * **Competency Based Approach** (in vocational training) * **Dual Training System** (there are for instance GIZ projects in the textile and hotel sectors for apprenticeships) |
| **Labor Market / Employment Mechanisms** | **ELMA**  The GIZ project PEJ (Promotion d’emploi des jeunes dans les régions rurales) already used the ELMA tool to identify the employment and labor market concerning the young people in rural areas in Morocco. |
| **Main Institutional Actors in Sustainable Economic Development** | **Ministries and Affiliated Bodies**   |  |  | | --- | --- | | **Ministry of National Education and Vocational Training (MEFP)** | Vocational Training Department (DFP)  Office for Vocational Training and Employment Promotion (OFPPT) | | **Ministry of Higher Education, Scientific Research and Training (MESFCRS)** | OFPPT  Universities including the different levels of scientific formation | | **Ministry of Employment and Social Affairs** | **Regional Committee for Employability Improvement (CRAME)**  **National Committee for Business Creation Support (CNACE)**  National Agency for the Promotion of Employment and Competencies (ANAPEC)  **OFPPT** | | **Ministry of Industry, Trade, Investment and the Digital Economy (MCINET)** | Moroccan Agency for Development and Investment (AMDI)  National Agency for the Promotion of SMEs (ANPME)  Moroccan Office for the Industrial and Commercial Property (OMPIC)  Higher Institute of Trade and Administration of Enterprises (ISCAE)  Moroccan Industry Observatory (OMI)  OFPPT | | **Ministry of Agriculture and Fisheries** | Agency for the Agricultural Development (ADA)  Institute for agronomic and veterinary research and formation (IAV) | | **Ministry of Housing and Urban Planning** | Groupe Al Omrane  University “Hassania” for Public Buildings and Roads (BTP)  School for Architecture (Ecole Nationale d’Architecture - ENA) | | **Ministry of Tourism** | Regional Centers for the Promotion of Tourism (CRTM) | | **Ministry of Equipment and Transport** |  | | **Ministry for Handicrafts and Social Economy** |  | | **Ministry of Habous and Islamic Affaires** |  |   **Concerned industrial and professional associations:**   * Moroccan Association of Solar and Wind Industries (AMISOLE) * Cluster Efficacité Energétique des Matériaux de Construction (Cluster EMC) * Cluster Solaire * Fédération Nationale de l'Electricité, de l'Electronique et des Energies Renouvelables (FENELEC) * Fédération des Industries Métallurgiques, Mécaniques et Électromécaniques (FIMME) * Fédération des Industries des Matériaux de Construction (FMC) * Fédération de l'Agro-Industrie (FAI) * Fédération Nationale de l'Agro-Alimentaire (FENAGRI) * Association Marocaine des Ingénieurs en Industries Agricoles et Alimentaires (AMI-IAA) * Association Nationale des Améliorations Foncières, de l'Irrigation, du Drainage et de l'Environnement (ANAFIDE) * General Confederation of Moroccan Enterprises (CGEM) * Moroccan Clean Production Center (under CGEM) |
| **Relevant Private Sector Actors** | **Main R&D, Manufacturers & Installers (selection):**   * **PV Industry (Jet Energy International):** manufacturing of solar panels, realization of PV projects * **Afrisolar Maroc:** PV and solar water pump installation and maintenance, energy audits * **Econosol:** Installation of solar water pumps and SWH, EE audits * **Elfa Solaire:** Installation of solar water pumps * **Atlas Solaire:** Installation & Maintenance of solar water pumps * **Green Economy Maroc:** PV installations * **Ecosolaris Maroc:** PV and solar water pump installations * **SEWT:** PV, solar water pump and SWH installation * **Solaire Direct:** Solar project development (solar farms and roof-top PV) * **Clean Energies:** Solutions for SWH, PV panels LED lamps and solar water pumps * **INABENSA MAROC:** construction of solar PV plants / centrals   **Wind tower manufacturers**: SPIE Maroc, Delta Holding, Delattre Levivier Maroc (DLM)  **NAREVA Holding** (owned by National Investment Company SNI, a holding company of King Mohammed VI): private developer and operator of several wind farms in Morocco. |
| **Open Issues / Reforms** |  |
| **Main Obstacles / Gaps** | * Very few certified training offers in TVET |

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| **Part 4: Anticipated Market Development by 2020/30** | | | |
| **Generation** | **Existing Capacity** | **Additionally planned projects** | **Targets** |
| **PV** | 37 MW | 1,320 MW | 4,500 MW PV+CSP (by 2030) |
| **CSP** | 180 MW | 950 MW |
| **SWH** | 530,093 m2 (by 2014) | 1.17 million m2 | 1.7 million m2 (by 2020)  3 million m2 (by 2030) |
| **Wind** | 737 MW | 1,320 MW | 4,300 MW (by 2030) |
| **Biomass** | > 7 MW biogas | Strategy under development | 400 MW (by 2030) |
| **Efficiency** | **Low** | **Moderate (BAU)** | **High** |
| **Buildings** |  |  | 20% against BAU scenario (2030) |
| **Industry** |  |  | 2.5%/yr against BAU scenario (2030) |
| **Agriculture** |  |  | 0.2%/yr against BAU scenario (2030) |
| **Transport:** |  |  | 30% against BAU scenario (2030) |
| **Socio-Economic Impact** | **Low** | **Moderate (BAU)** | **High** |
| **GDP growth (% p. a.)** |  | 3.58% by 2020[[30]](#endnote-30) |  |
| **Value Added** |  |  | 20 billion MAD additional through thermal regulation |
| **Employment** | EE in Buildings (2030): (Plan Bleu)  210,500 new jobs | Overall Unemployment Rate reduction from 9.6% to 9.21%  EE in Buildings (2030): (Plan Bleu)  251,250 new jobs  Total RE: 15,874 new jobs[[31]](#endnote-31)  Wind: 4,000 new jobs  CSP: 4,714 new jobs  PV: 7,160 new jobs  EE: 27,906 man years | Overall Unemployment Rate reduction from 9.6% to 3.9% (2025)  EE in Buildings (2030): (Plan Bleu)  292,000 new jobs  SWH:  920 new permanent jobs (MEMEE)  1,600 (by 2030)  11,000 (by 2030; 50% in manufacturing, 50% in installation & maintenance) (Plan Bleu)  Wind Program: (AfDB)  4,000 – 5,000 new permanent jobs |

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| **Part 5: Most Relevant Interlocutors & Cooperation Partners for RE-ACTIVATE** | | | |
| **Actor** | **Name** | **Focus** | **Opportunity for Cooperation** |
| **GIZ:**   * **Sustainable Infrastructure: Energy/Water Environment** * **Sustainable Economic Development: PSD/EP/TVET** | Support of the Moroccan Energy Policy (PAPEM ) (2015-2017)  German Climate Technology Initiative (DKTI I) (2013-2017)  2014.2498.5: RE/EE in the Regions of Tata and Midelt (DKTI III) (2016-2019)  03.3505.9-024.00: SFF Electricity Scenarios  2015.4100.2: Creating jobs in rural waste water management and sanitation  2014.4109.6: Employment Promotion through EE in Mosques (2015-2017)  2014.2019.9: Employment Promotion of Young People in Rural Areas (PEJ) (2015-2017)  2014.4108.8: Economic Promotion & Rural Development in Disadvantaged Regions (PEDEL) (2015-2017)  2015.2171.5: Mobile Training Centers for the Rural Population in Morocco (MAZ) (2016-2018)  2014.2021.5: Promotion of MSMEs in Morocco (TAM) | Improve institutional and legal framework for RE/EE; Energy scenarios up to 2050  Increase know-how on RE technologies in companies and training centers  Enhance capacities in order to respond to planned solar plan projects in these regions  Support MEMEE in developing long-term energy planning capacities  Integrate Employment Focus in the Moroccan “EE in Mosques” Program, generate 160 jobs  Employment Promotion in the regions Taza-Al Hoceima-Taounate and Fès-Boulemane  Improve Economic Performance in the regions Midelt, Ouarzazate, Tata, Tinghir and Zagora  Employment Promotion in specific sectors, including water, energy and tourism  Promotion of Services, Clusters and Networks | Integrate focus on employment creation in energy policy  Develop / implement quality standards for RE/EE trainings and training providers; develop / implement needs-oriented further training / capacity building for firms  Strengthen planning and capacities for small applications; Development / Implementation of (certified) trainings in PV/SWH (+standards); Complementary actions in the regions of project activity  Study effects of scenarios on local value and job creation and vice versa  Jobs in biogas production  Job Creation Potential through EE in Buildings (already in progress)  Integrate RE/EE component in trainings / job programs  Promote RE/EE in agriculture and food processing  Integrate RE/EE component in trainings / job programs  Identify needs in qualifications in RE/EE MSMEs |
| **Non-GIZ:**   * **Domestic public institutions** * **Private sector/ civil society** * **International organizations on the ground** | ADEREE, ONEE, MASEN  Cluster (Solar / EMC)  KfW, UNDP, WB, AFDB |  | Integrate certified training offers in RE/EE  Cluster Cooperation / develop strategy and activities (see cluster study); Integration of certified training offers in RE/EE |
| **Part 6: Identifiable Future Opportunities for German International Cooperation** | | | |
| **Sector** | **Objectives** | **Outcomes** | **Partner** |
| PV | Increase know-how in PV sector | * Establish training programs for (on-grid) installation and maintenance | DKTI I & III, IFMEREE, Cluster Solaire |
| Wind | Improve potential for small-scale wind projects, support creation of a training center for wind technicians for O&M | * Certified trainings for small-scale constructions and installation, incl. dual training systems * Trainings and standards for maintenance (BZEE diploma) | DKTI I, IFMEREE  ONEE  AMISOLE  BZEE |
| PV & Wind | Enable production of electrical components | * Conduct trainings in electrical & electronics industries for manufacturing of PV- & wind-specific electrical components | AMISOLE  ONEE  Cluster Solaire |
| SWH | Encourage local production | * Increase trainings for manufacturing of SWH, incl. on the basis of dual training system * Potential Analysis (jobs, …) | ADEREE (SHEMSI),  Cluster Solaire  AMISOLE |
| RE/EE | Improve quality infrastructure of Trainings | * state-approved vocational training programs for existing training providers * copy IFMEREE concept (even in TUN/EGY) * official certification for qualifying trainings | DKTI I / IFMEREE |
| RE/EE in rural areas | Implement trainings in rural/isolated areas | * develop RE/EE training offers (solar PV, CSP, pumps, EE, …) * support establishment of training centers | DKTI III, PEDEL, Mobile Training Centers |
| RE/EE | Identify exact tasks and skill needs | * Define Job Task Analyses for all RE/EE related jobs * Develop an official catalogue incl. job potentials in the different sectors | DKTI I / IFMEREE / DFP  Green Mosques (EE in buildings study)  (ER in agriculture study)  ELMA tool  CADRE tool |
| PV | Quality Insurance of installation | * Support development of standards for PV installers * (Regional) Certificate for PV installers | RCREEE  ADEREE (SHAMSI?) |
| Biomass | Supporting market development | * Study biomass potential (market development, job effects, training needs) (after implementation of biomass strategy?) | GIZ-Project on employment promotion in waste water treatment, solid waste (SWEEPNET) and biogas/cogeneration |
| Financing RE/EE | Boost small-scale RE/EE adoption | * Analysis of financing needs and instruments (special loans, subsidies) to deal with high upfront investment costs |  |
| RE | Promotion of (small-scale) RE applications by private sector | * Study effects of Net-Metering for households (LV) + industry (MV) on local value and employment creation | SFF Electricity Scenarios |
| Solar Water Pumping | Encourage use of solar water pumps | * Awareness raising campaigns for farmers concerning the profitability | Ministry for Agriculture, ADEREE, local companies |

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